

# Claims

- [c1] 1. A method for controlling regenerative braking in a vehicle having a regenerative braking system, the method comprising:  
determining a first vehicle condition when the vehicle is braking;  
determining a second vehicle condition; and  
reducing regenerative braking torque to zero, the reduction beginning when the second vehicle condition reaches a first predetermined value, the first predetermined value being based on the first vehicle condition.
- [c2] 2. The method of claim 1, the vehicle also having a friction braking system, wherein the first vehicle condition includes one of friction brake capability, vehicle deceleration, overall braking torque, overall braking power, overall braking force, brake pedal position, suspension load, and suspension position.
- [c3] 3. The method of claim 1, wherein the second vehicle condition is a vehicle speed, a powertrain torque, or a combination of vehicle speed and powertrain torque.
- [c4] 4. The method of claim 1, wherein the regenerative

braking torque is reduced to reach zero at a second predetermined value, the second predetermined value being based on the first vehicle condition.

- [c5] 5. The method of claim 4, wherein the first predetermined value is a first vehicle speed and the second predetermined value is a second vehicle speed.
- [c6] 6. The method of claim 4, further comprising controlling regenerative braking torque according to a predetermined torque curve based on the first vehicle condition, the predetermined torque curve including a first point and a second point, the first point being defined by a maximum regenerative braking torque and the first predetermined value, the second point being defined by zero regenerative braking torque and the second predetermined value.
- [c7] 7. The method of claim 6, wherein the first and second points define a first curve segment, the first curve segment defining regenerative braking torque values equal to a predetermined percentage of a maximum available regenerative braking torque.
- [c8] 8. The method of claim 6, wherein the first vehicle condition is vehicle deceleration or overall braking torque, and the regenerative braking torque is controlled ac-

ording to at least one curve chosen from a plurality of torque curves, each of the torque curves corresponding to the first vehicle condition and having corresponding first and second points, and wherein there is an inverse relationship between the first vehicle condition and the maximum regenerative braking torque.

- [c9] 9. The method of claim 8, wherein the regenerative braking torque is controlled according to a single torque curve when the first vehicle condition remains constant or decreases during braking, and wherein the regenerative braking torque is controlled according to more than one torque curve when the first vehicle condition increases during braking.
- [c10] 10. The method of claim 8, wherein there is a direct relationship between the first vehicle condition and the first predetermined value.
- [c11] 11. The method of claim 8, wherein the first predetermined value is approximately constant for each of the torque curves.
- [c12] 12. The method of claim 8, wherein the distance between corresponding first and second points can be represented by a time, and wherein the time is approximately constant for each of the torque curves.

- [c13] 13. A method for controlling a vehicle having a regenerative braking system, the method comprising:  
determining when a vehicle operator commands vehicle braking;  
using at least regenerative braking to reduce a speed of the vehicle when the operator commands vehicle braking;  
determining a first vehicle condition when the vehicle is braking;  
determining a second vehicle condition; and  
reducing regenerative braking torque when the second vehicle condition reaches a first predetermined value, the first predetermined value being based on the first vehicle condition.
- [c14] 14. The method of claim 13, the vehicle also having a friction braking system, wherein the first vehicle condition includes one of friction brake capability, vehicle deceleration, overall braking torque, overall braking power, overall braking force, brake pedal position, suspension load, and suspension position.
- [c15] 15. The method of claim 13, wherein the second vehicle condition is a vehicle speed, a powertrain torque, or a combination of vehicle speed and powertrain torque.

[c16] 16. The method of claim 13, wherein the regenerative braking torque is reduced to reach zero at a second predetermined value, the second predetermined value being based on the first vehicle condition.

[c17] 17. The method of claim 16, wherein the first predetermined value is a first vehicle speed and the second predetermined value is a second vehicle speed.

[c18] 18. A vehicle, comprising:  
an electric machine operable to provide regenerative braking for the vehicle;  
at least one sensor configured to detect a corresponding vehicle condition and to output at least one signal related to each corresponding detected vehicle condition;  
and  
a controller in communication with the electric machine and the at least one sensor, the controller being configured to determine first and second vehicle conditions based on signals received from the at least one sensor when the vehicle is braking, the controller being further configured to command the electric machine to reduce regenerative braking torque to zero, the reduction beginning when the second vehicle condition reaches a first predetermined value, the first predetermined value being based on the first vehicle condition.

[c19] 19. The vehicle of claim 18, further comprising a friction braking system, wherein the first vehicle condition includes one of friction brake capability, vehicle deceleration, overall braking torque, overall braking power, overall braking force, brake pedal position, suspension load, and suspension position.

[c20] 20. The vehicle of claim 18, wherein the second vehicle condition includes a vehicle speed, a powertrain torque, or a combination of vehicle speed and powertrain torque.